Title: Mailbox Mystery

Brief Overview:

The students will use problem-solving strategies to solve a mystery based upon the book, Even Steven and Odd Todd, by Kathryn Cristaldi. They will assist two fictional characters in solving clues about even and odd numbers, place value, and number comparisons. They will also create their own clues for a number mystery by applying these skills.

NCTM 2000 Principles for School Mathematics:

- **Equity:** *Excellence in mathematics education requires equity - high expectations and strong support for all students.*

- **Curriculum:** *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*

- **Teaching:** *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*

- **Learning:** *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*

- **Assessment:** *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*

- **Technology:** *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

Links to NCTM 2000 Standards:

- **Content Standards**

Number and Operations

- *Understand numbers, ways of representing numbers, relationships among numbers, and number systems; recognize equivalent representations for the same number and generate them by decomposing and composing number.*
- *Compute fluently and make reasonable estimate; select appropriate methods and tools for computing with whole numbers from among mental computation, estimate, calculators, and paper and pencil according to the context and nature of the computation and use the selected method or tools.*

Algebra

- *Understand patterns, relations, and functions; and represent and analyze patterns and functions, using words, tables, and graphs.*
- *Use mathematical models to represent and understand quantitative relationships; and model*

problem situations with objects and use presentations such as graphs, tables, and equations to draw conclusions.

Data Analysis and Probability

- *Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them; collect data using observations, surveys, and experiments; and represents data using tables and graphs such as: line plots, bar graphs, and line graphs.*
- *Develop and evaluate inferences and predictions that are based on data; and propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions.*
- *Understand and apply basic concepts of probability; describe events as likely or unlikely and discuss that degree of likelihood using such words as certain, equally likely and impossible; predict the probability of outcomes of simple experiments and test the predictions; and understand that the measure of the likelihood of an event can be represented by a number from 0 to 1.*

- **Process Standards**

Problem Solving

- *Instructional programs from pre-kindergarten through grade 12 should enable all students to build new mathematical knowledge through problem solving; solve problems that arise in mathematics and in other contexts; apply and adapt a variety of appropriate strategies to solve problems; and monitor and reflect on the process of mathematical problem solving.*

Reasoning and Proof

- *Instructional programs from pre-kindergarten through grade 12 should enable all students to recognize reasoning and proof as fundamental aspects of mathematics; make and investigate mathematical conjectures; develop and evaluate mathematical arguments and proofs; and select and use various types of reasoning and methods of proof.*

Communication

- *Instructional programs from pre-kindergarten through grade 12 should enable all students to organize and consolidate their mathematical thinking through communication; communicate their mathematical thinking coherently and clearly to peers, teachers, and others; analyze and evaluate the mathematical thinking and strategies of others; and the language of mathematics to express mathematical ideas precisely.*

Connections

- *Instructional programs from pre-kindergarten through grade 12 should enable all students to recognize and use connections among mathematical ideas; understand how mathematical ideas interconnect and build on one another to produce a coherent whole; and recognize and apply mathematics in context outside of mathematics.*

Representation

- *Instructional programs from pre-kindergarten through grade 12 should enable all students to create and use representations to organize, record, and communicate mathematical ideas;*

select, apply, and translate among mathematical representations to solve problems; and use representations to model and interpret physical, social, and mathematical phenomena.

Grade/Level:

Grades 2-3

Duration/Length:

Five days (50 minutes each day)

Prerequisite Knowledge:

Students should have working knowledge of the following skills:
- Place value to thousands
- Comparing numbers using symbols to represent greater than, less than, and equal to
- Gallery walk
- Criteria setting for journal prompts

Student Outcomes:

Students will be able to:
- identify numbers as odd or even.
- apply knowledge of place value to thousands.
- compare and order numbers using the terms greater than, less than, and equal to.
- complete a performance assessment by:
    - applying knowledge of math concepts to answer questions about numbers.
    - creating clues using math vocabulary.
    - using problem-solving strategies.
    - writing a comparison paragraph using a graphic organizer

Materials/Resources/Printed Materials:

For the teacher
- Even Steven and Odd Todd by Kathryn Cristaldi (Day 1)
- T-Chart on chalkboard (Day 1)
- Transparency of Mailbox Map (SR #3) (Day 2-4)
- Transparency of Cross It Off (SR #5) (Day 2)
- Clues (TR #1-3) (Day 2-4)
- Base Ten Blocks (Day 3)

For each pair
- Digit cards (TR #4); cut apart (Day 2)
- 1 die (Day 4)

For each student

Day 1:

- Journal Prompt (SR #1)
- Colorful Characters (SR #2)
- crayons

Day 2:

- Mailbox Map (SR #3) *needed for every day in unit!
- Even or Odd? (SR #4)
- Paper cup with small manipulatives (between 10 and 30 pieces per cup)
- Cross It Off (SR #5)
- Odd or Even Assessment (SR #6)

Day 3:

- Place Value Riddle (SR #7)
- Place Value Pizza (SR #8)
- Place Value Assessment Riddle (SR #9)
- Base Ten Blocks (if needed)
- Scissors and Glue

Day 4:

- Number Comparison Journal (SR #10)
- High Rollers (SR #11)
- Number Comparison Assessment (SR #12)
- Super Math Detective Badge (SR #13)
- Base Ten Blocks (if needed)
- Crayons

Day 5:

- Even Eve Gets Even (SR #14)

Development/Procedures:

Day 1: Introduction to Even and Odd

- Warm-up: Distribute journal prompt (SR #1). Students will complete the journal prompt after discussing the criteria for journal completion. Examples of criteria you may lead the students to identify are *give specific examples of something they have seen that was even or odd, use numbers and pictures, label,*and *why are even and odd numbers useful.*
- Share journals by completing a gallery walk around the classroom to read other student's work.
- Read the story, Even Steven and Odd Todd, by Kathryn Cristaldi. Direct the students to listen for the numbers preferred by each character. Create a T-Chart on the board and have the students list the numbers of items preferred by Even Steven and Odd Todd.
- Through discussion, define the terms, *even* and *odd* (Even numbers can be equally divided into 2 groups without remainders. Odd numbers cannot be divided equally into 2 groups.)
- State the title of the unit – *Mailbox Mystery*. Lead a short discussion on characteristics of a mystery, such as the use of clues, finding a treasure, solving a problem, detective, and sidekick, etc.

- Introduce the following scenario:
  Even Steven and Odd Todd both have sisters. Their names are Even Eve and Odd Maude. They enjoy playing tricks on each other by hiding each other's things in strange places. Over the next few days, our class will help the girls solve clues to discover where their missing objects have been hidden this time. After successfully completing the activities for each day, you will earn a clue to help solve their latest mystery – the mailbox mystery.
- Distribute Colorful Characters (SR #2). After reviewing the terms, even and odd, encourage each student to draw a picture of the two girls, decorate their clothes with their favorite numbers, and show a group of toys that each girl might have.

Day 2: Even and Odd

- Have the students take a gallery walk around the class to view everyone's pictures from Day 1. Discuss how the characters are different from each other.
- Explain that today the class will explore even and odd numbers more extensively by completing activities/games with even and odd numbers.
- Give each student a copy of the Mailbox Map (SR #3). Continue to explain the scenario: *Even Eve is missing her four Harry Potter books. Odd Maude has hidden them in a mailbox in their neighborhood. Odd Maude has left clues for Even Eve to locate the mailbox, but you must help her earn them. With each activity that you complete successfully, you will receive one clue for Even Eve. Hurry up, detectives! Let's complete the first set of activities to EARN THAT CLUE!*
- Allow each student to make a prediction as to which mailbox the books are hidden. Have each student place a star near the mailbox.
- Distribute Even or Odd? (Student Resource 4) and cups of small manipulatives such as plastic cubes or beans. Instruct students not to look in the cup. Read and discuss directions on SR4. Allow students to complete the exploration activity in 5-10 minutes.
- Allow 1 or 2 students to model their solution to the activity.
- Lead students to understand that a number is even or odd based upon the number in the ones place/column. Model this with manipulatives several times using 2 digit numbers.
- Students will play Cross It Off (SR #5) using digit cards (TR #4). Read the directions and model how the game is played before distributing manipulatives. Then, allow students to play in pairs. Each pair should complete at least one game. Early finishers could play a second game. (Teachers should practice playing the game in advanced!)
- Complete Odd or Even Assessment (SR #6). Students should write a 2-digit number, (odd or even) and explain why it is odd or even, using words and pictures.
- Display the first clue for Even Eve – *If you want to see your books again, an ODD mailbox is what they're hidden in* (TR #1). Read and solve using knowledge of even and odd numbers. Cross off the mailboxes that do not fit the clue. Model using the transparency. As an extension, have students identify the pattern of odd and even numbers used in the organization of house numbers.

Day 3: Place Value

- Take out Mailbox Map (SR #3) and check and revise predictions from Day 2. Discuss why students feel their prediction will now be correct. Discuss the relationship between Odd Maude and the mailbox numbers that remain (Odd Maude only likes odd numbers and the mailboxes that are left all have odd numbers.).
- Give each student Place Value Riddle (SR #7). Read and discuss directions and allow students 3-5 minutes to work. Allow partners to share and explain responses. Invite a volunteer to share their answer with the class. Discuss the strategies used to solve the riddle. Be sure to use math vocabulary, including thousands, hundreds, tens, and ones.
- For extra review and practice, use base ten blocks on the overhead to model different 3-digit numbers. For example, put 3 flats, 5 longs, and 7 units on the overhead and ask the students how they would write that number. Do this activity several times.
- Next write some numbers on the board and ask students place value questions. For example, write 7,564 and ask *what number is in the tens place? What is the place value of 5 in the number? How many ones are there?* Etc.
- Give each student Place Value Pizza activity (SR #8). Explain directions before students begin. Students will place toppings on the pizza based on place value clues. Review odd and even after the activity by asking students *whose pizza this could be – Eve's or Maude's?* (Hint: Count the number of pepperoni on the pizza.)
- Complete Place Value Assessment Riddle (SR #9). Students will apply place value skills to determine the mystery number. They will also write an explanation to help a younger friend understand place value.
- Display the second clue for Even Eve – *A 7 in the hundreds place is where you'll find the missing books that are still on your mind* (TR #2). Read and solve using knowledge of place value. Cross off the mailboxes that do not fit the clue. Model using the transparency. As an extension, have students identify the place value of numbers in the remaining mailboxes.

Day 4: Comparing Numbers

- Take out Mailbox Map (SR #3) and check and revise predictions from Day 3.
- Distribute Number Comparison Journal (SR #10) and allow students 5 minutes to compare the numbers using words and symbols. Discuss criteria before writing (*specify by using <, >, or =, and use math vocabulary*).
- Take a gallery walk to examine each other's work. Allow volunteers to show how they compared the numbers. List comparison vocabulary on the board for further discussion, such as greater than, less than, equal to, <, >, and =.
- As an explanation, display the numbers *541* and *539*. Model the process for comparing numbers by comparing the two numbers in the largest common place (in this case, the hundreds column). Explain that if the digits are different, the larger one makes the entire number larger. But if the digits are the same, move to the next smaller column (the tens place). Continue in this fashion. You may wish to use Base Ten Blocks to assist visual learners.
- Model the comparison process using several sets of numbers, such as 1,358 and 2,358, 469 and 1,246, and 3,842 and 3,841. Refer to the vocabulary list on the board to

encourage proper communication about the numbers.

- For practice and application, students will play High Rollers (SR #11) using dice. Give each pair of students one die and 2 game boards. Students will take turns rolling the die and writing the number that they roll in a particular place value column. The object of the first game is to create the largest number after 4 rolls. They will write number sentences using the comparison symbols, <, >, or =. After three rounds, the object of the game changes to create the smallest number possible. For the third game, students try to secretly create the largest number by rolling and placing the same numbers on the boards, without looking at each other's game board. Model each game and discuss possible strategies for winning. (Teachers should practice playing the game in advance.)
- Complete the Number Comparison Assessment (SR #12) by comparing 4 numbers and listing them in order from greatest to least. Students should explain how they determined the order of the numbers.
- Display the third clue for Even Eve – *My trick has finally come to an end, this is the final clue my friend. The mailbox that contains your books has all odd digits if you look. But there's two left – which could it be? The greater one, go look and see!* (TR #3). Read and solve using knowledge of comparing numbers. Cross off the mailboxes that do not fit the clue. As an extension, have students identify the greatest and least number out of all the mailboxes.
- Reveal the answer and give each student a Super Math Detective Badge (SR #13). Instruct students to keep it for tomorrow's math adventure. If time permits, students may color their badges.

Day 5:

Performance Assessment

The students will complete the Performance Assessment activity (SR #14). They will apply their knowledge of odd and even numbers, place value, and number comparison by "helping" Even Eve get even with Odd Maude. They will choose a mailbox to hide Odd Maude's 3 N'SYNC cds in and write clues to lead her to the correct mailbox. They will answer questions related to the math topics addressed, and write a paragraph to explain understanding of these concepts by using ideas organized on a Venn Diagram.

Scoring Rubric:

Activity 1:

3 – Student answered all questions correctly
2 – Student answered 3 or 4 questions correctly
1 – Student answered 1 or 2 questions correctly

Activity 2:

3 Student correctly completes all of the following:
- Student completes all blanks
- Student identifies his/her number as odd or even
- Student matches a number to the correct place value
- Student identifies the number as greatest or smallest

2 Student incorrectly completes one of the following:
- Student completes all blanks
- Student identifies his/her number as odd or even
- Student matches a number to the correct place value
- Student identifies the number as greatest or smallest

1 Student incorrectly completes two or more of the following:
- Student completes all blanks
- Student identifies his/her number as odd or even
- Student matches a number to the correct place value
- Student identifies the number as greatest or smallest

Activity 3:

3 - Student provides specific examples
- Student clearly explains a strategy for identifying odd/even numbers
- Student correctly uses place value vocabulary, such as ones or thousands, to describe one or more number
- Student correctly compares numbers using greater than or less than

2 - Student provides examples
- Student explains a strategy for identifying odd/even numbers
- Student uses place value vocabulary, such as ones or thousands, to describe one number
- Student compares numbers

1 - Student does not provide examples
- Student identifies odd/even numbers
- Student incorrectly uses place value vocabulary
- Student incorrectly compares numbers

Extension/Follow Up:

The teacher could follow this unit with one or more of the following activities:

- Write a class book about Even Eve and Odd Maude.
- Complete a map of their neighborhood using house numbers.
- Act out a math mystery by providing clues to guess a mystery number.

Authors:

Kerry Duva
Pinewood Elementary School
Baltimore County, Maryland

Erin McLaughlin
Woodmoor Elementary School
Baltimore County, Maryland

Journal Prompt

Student Resource Sheet # 1

Explain what you know about the terms ***even*** *and* ***odd.***

Scoring Criteria

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

_____

_____

_____

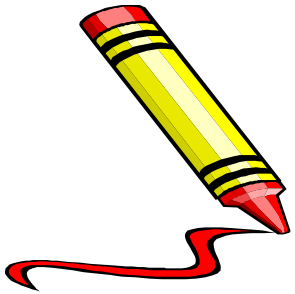
_____

_____

_____

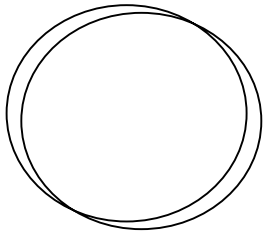
Name: _____ Date: _____

Colorful Characters



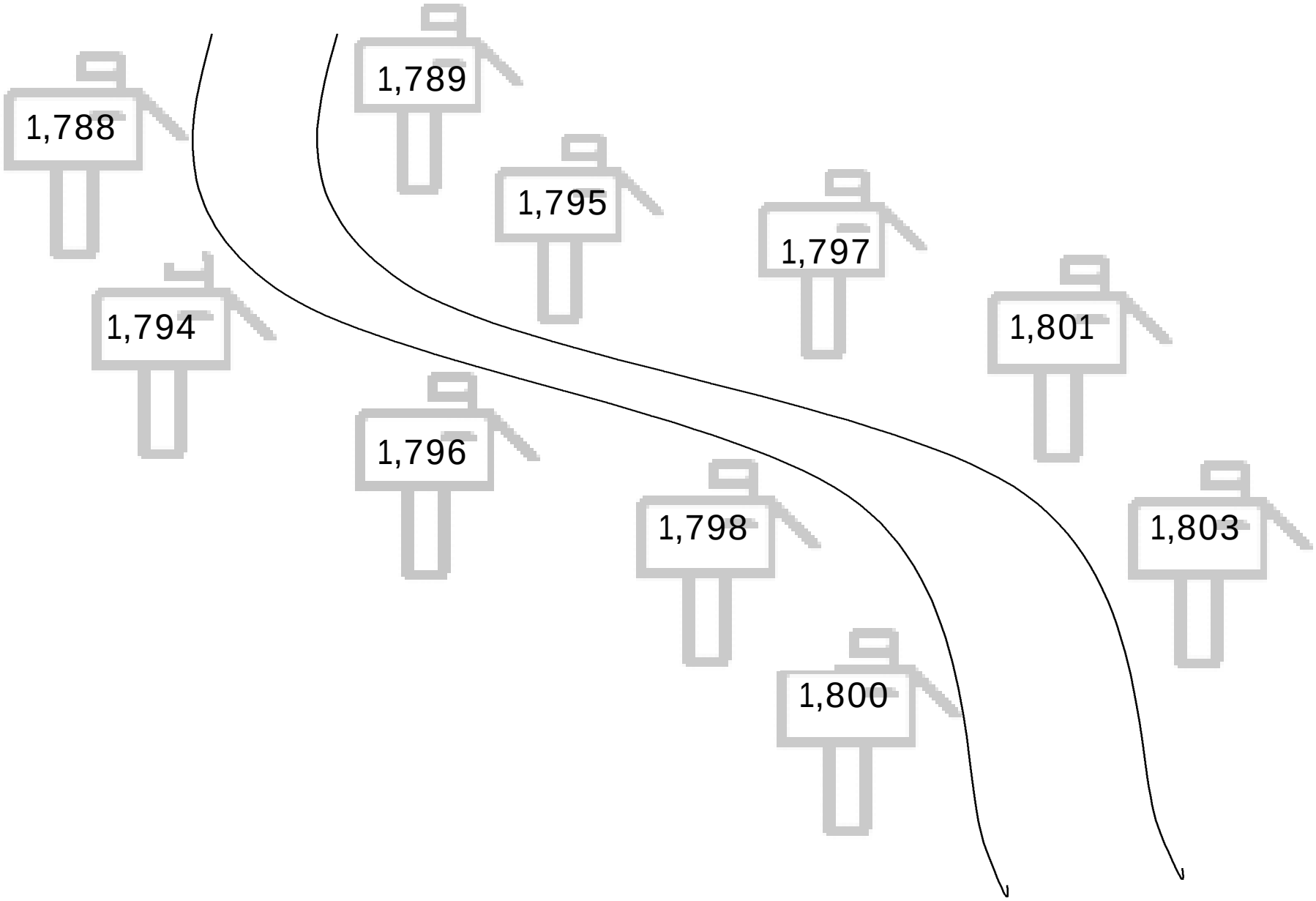
Directions:

1. Color the characters how you think they might look. Be creative!
2. Decorate their clothes with the numbers they like best.
3. Draw toys that each girl might like to play with.

Even Eve	Odd Maude
	

Name: _____ Date:_____

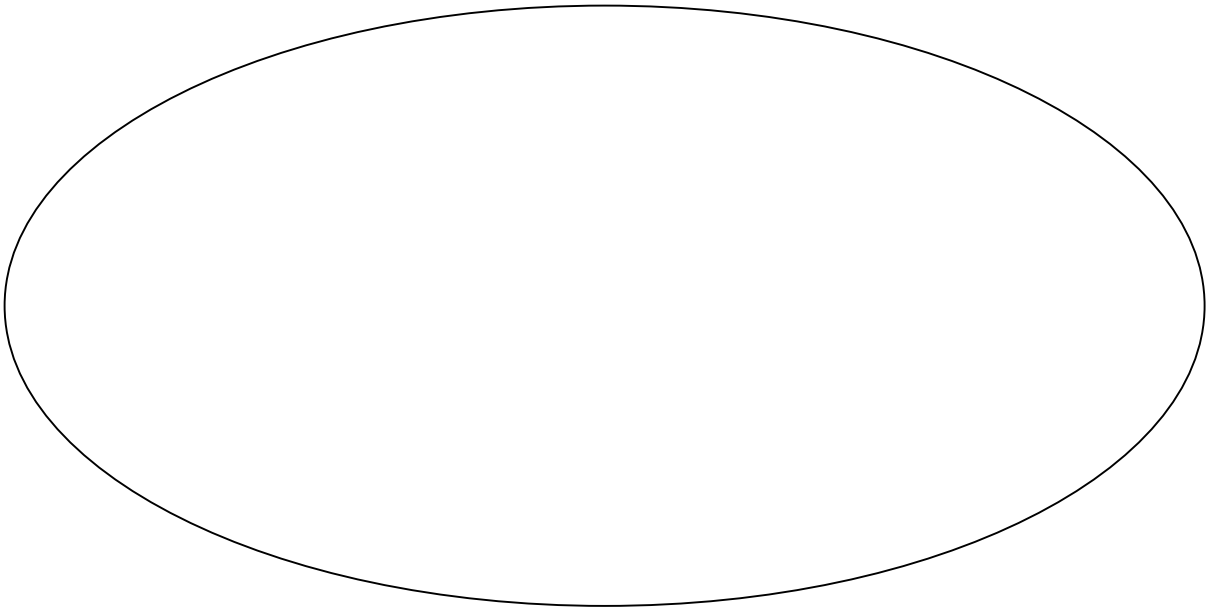
Mailbox Map



Name: _____

Even or Odd?

Directions: Remove the manipulatives from the cup. Count them using any method. Draw a picture of your manipulatives.

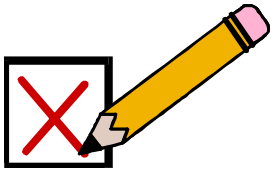


Write the amount of manipulatives. _____

Do you think your amount is *even* or *odd*? _____ How do you know? Use your drawing above to explain your thinking and write your response below. Remember to use math vocabulary.

I think my amount is _____ because _____
_____
_____
_____
_____
_____
_____
_____

Name: _____ Date: _____



Cross It Off

Predict:
How many turns will you need to complete the game? Good Luck!

Total Turns
Game 1
Game 2

How to play the game:
Place the digit cards in a pile upside down. Player one chooses two digit cards. Create a 2-digit number with the cards. Write it on the board and then cross off a box on your game board. If you don't need that number, put a tally mark in the Extras table. Place the digit cards back in the pile, and player two follows the same directions.

***The game ends when** you put Xs over all the boxes on your game card.*

***The goal** is to cross off all of the boxes on your game card in the fewest number of turns. Record the results.*

Game 1

Even	**Even**	**Even**	**Even**
Odd	**Odd**	**Odd**	**Odd**

Extras

Even	**Odd**

Game 2

Even	**Even**	**Even**	**Even**
Odd	**Odd**	**Odd**	**Odd**

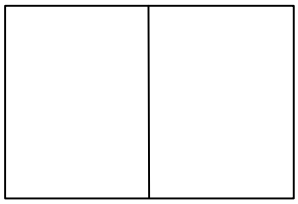
Extras

Even	**Odd**

Name: _____ Date: _____

Odd or Even - Assessment

Directions: Write a two-digit number in the boxes below. You may choose whether to write an odd or even number. Then, using what you have learned about even and odd numbers, explain why your number is even or odd. Remember to use math vocabulary in your explanation.



My two-digit number is an _____ number. I know this because

_____

_____

_____

_____

_____

_____

You may also draw a picture to support your answer.

Name: _____Date: _____

Place Value Riddle

4,675

What number is in the tens place? _____

How many hundreds are there? _____

The number 4 has what place value? (circle one)

ones thousands tens

The number 5 has what place value? (circle one)

ones thousands hundreds

Name: _____ Date:_____

Place Value Riddle

4,675

What number is in the tens place? _____

How many hundreds are there? _____

The number 4 has what place value? (circle one)

ones thousands tens

The number 5 has what place value? (circle one)

ones thousands hundreds

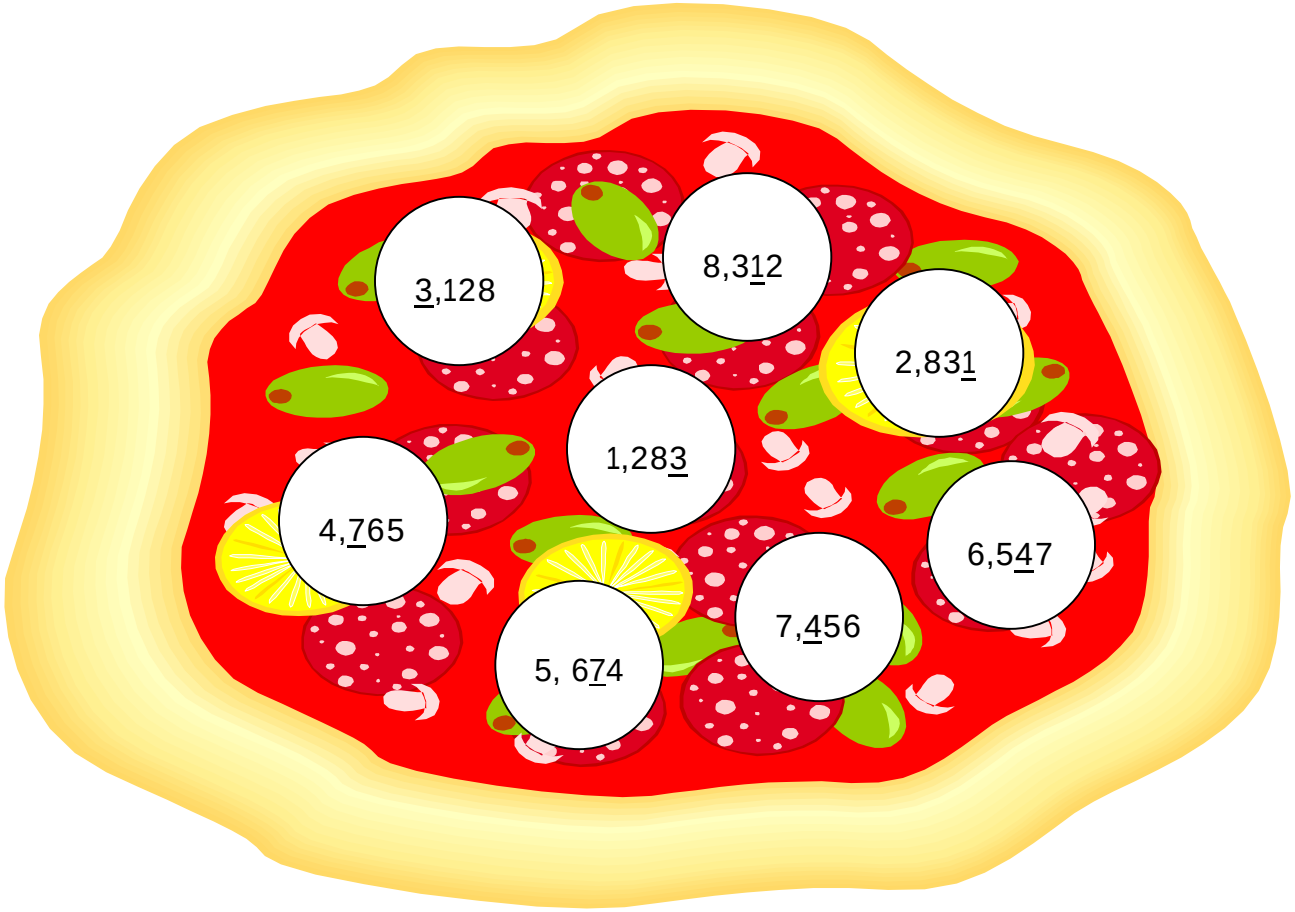
Name: _____ Date:_____

Name: _____ Student Resource Sheet # 8

Place Value Pizza

Directions:

1. Cut out the pepperoni pieces at the bottom of the paper.
2. Glue the pepperoni pieces on top of the appropriate space on the pizza.



7 Hundreds	1 One	4 Tens	3 Thousands
7 Tens	1 Ten	4 Hundreds	3 Ones

Place Value Assessment Riddle

Read the clues below to write the mystery number.

It is a four-digit number.

There is a 7 in the hundreds place.

There are 6 ones.

There is a 1 in the thousands place.

There are 4 tens.

What is the mystery number? ___ , ___ ___ ___

Now that you are a place value expert, explain to a first grader what you know about place value. Don't forget to use the words hundreds, ones, tens, and thousands! You may want to pick a four-digit number to use as an example.

_____

_____

_____

_____

_____

_____

_____

Name: _____ Date: _____

Number Comparison

Look at the two numbers below. Compare the numbers using words and symbols.

247 268

_____

_____

_____

_____

_____

_____

_____

_____

Scoring Criteria

- _____
- _____
- _____

Name: _____

Number Comparison

Look at the two numbers below. Compare the numbers using words and symbols.

247 268

_____

_____

_____

_____

_____

_____

_____

_____

Scoring Criteria

- _____
- _____
- _____

Name: _____

High Rollers

The object of the game is to create the largest number possible. Player one rolls the die and both players write that number in any column on their place value board. Continue with player two rolling. Continue to complete the place value game board until each column is complete. Compare numbers. Write a number sentence to show the comparison of the two numbers. The winner has the greatest number.

Game 1

TH,	H	T	O

_____ ( ) _____

Player 1 Player 2

Winner? _____

Game 2

TH,	H	T	O

_____ ( ) _____

Winner? _____

The object of the game is to create the smallest number possible. Play the game just like High Rollers. When each place value game board is complete, write a number sentence to show the comparison of the two numbers. The winner has the smallest number.

Game 1

TH,	H	T	O

_____ ( ) _____

Player 1 Player 2

Winner? _____

Game 2

TH,	H	T	O

_____ ( ) _____

Winner? _____

The object of the game is to create the largest number possible. Player one rolls the die and both players write that number, <u>without seeing each other's game boards</u>. Continue with player two rolling. Continue to complete the place value game board until each column is complete. Compare numbers by writing a number sentence to show the comparison. The winner has the greatest number.

Game 1

TH,	H	T	O

_____ ( ) _____

Player 1 Player 2

Winner? _____

Game 2

TH,	H	T	O

_____ ( ) _____

Winner? _____

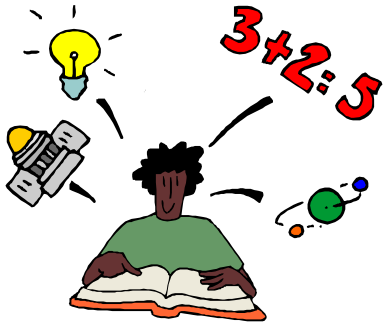
Number Comparison Assessment

Look carefully at the four numbers below. Use what you know about place value and comparing numbers to put the four numbers in order from greatest to least.

456 783 392 465

Greatest Least

_____ _____ _____ _____



Use the lines below to explain what strategy you used to place the numbers in the correct order. Be sure to use good math vocabulary!

_____

_____

_____

_____

_____

_____

_____

Name: _____ Date: _____

Super Math Detective

Super Math Detective

Super Math Detective

Super Math Detective

If you want to see your four books again, an ODD mailbox is what they are hidden in.

Odd Maude

CLUE #1

A 7 in the hundreds place is where you will find the missing books that are still on your mind.

Odd Maude

CLUE #2

My trick has finally come to an end. This is the final clue my friend.
The mailbox that contains your books, has all odd digits if you look.
But there are two left -- which could it be?
The greater one, go look and see!

- Odd Maude

CLUE #3

Even Eve Gets Even!

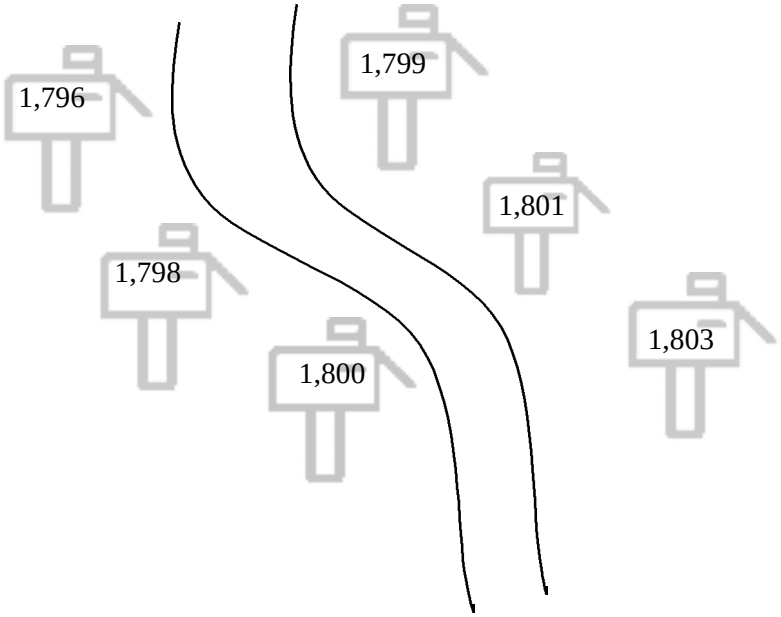
Even Eve was not happy about the joke Odd Maude played on her, so she has decided to get even. Read the letter from Even Eve below to find out how you can help.

Dear friend,

Thank you so much for helping me find my four Harry Potter books. I am going to get even with Odd Maude by hiding her three N'SYNC cds in a mailbox. Help me choose a mailbox from the map and write clues to lead her to the cds. Make sure the clues include hints about odd and even numbers, place value, and number comparison. Make sure your clues make sense and lead her to the correct mailbox. Thank you for helping me!

Your friend,
Even Eve

Name: _____ Date: _____



Choose a mailbox by drawing a circle around it. Write the number on the line below.

Activity 1: Before you write the clues to give to Odd Maude, carefully study the mailbox numbers and answer the questions below.

1. List all of the even numbered mailboxes.

   _____

2. Look at the odd numbered mailboxes. What numbers are in the tens place? _____

3. Using all of the mailboxes, which one has the greatest number?

   _____

4. Using all of the mailboxes, which number is the least? _____

5. Using all of the mailboxes, write the numbers in order from least to greatest.

   _____ _____ _____ _____ _____ _____

Name: _____ Date: _____

Activity 2: Now that you have chosen a mailbox in which to hide the cds, you must write three clues to lead Odd Maude to the mailbox.

Clue #1

If you want to find the cds I took,

In an _____ mailbox you'll
(odd or even)
have to look.

Even Eve and _____
Your name

Clue #2

A ____ in the _____ place
tens/hundreds
Is where you'll find,

The missing cds that are still on

your mind.

Even Eve and _____

Name: _____ Date: _____

Clue #3

The mailbox where you'll find N'SYNC,

may have but one missing link.

To find the three cds, have no fear,

Go to the _____ one my dear!
Greatest/smallest

Even Eve and _____

* Now that you have written your clues, go back and check to see that they lead you to the correct mailbox.

Activity 3: Choose two mailbox numbers from the map on page 2. Write them on the lines below. Then, compare the numbers using a Venn Diagram. Be sure to include details, such as odd/even, place value, and comparison words.

_____ _____

Name: _____ Date: _____

Using the information in the Venn Diagram, write a short paragraph comparing the numbers.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

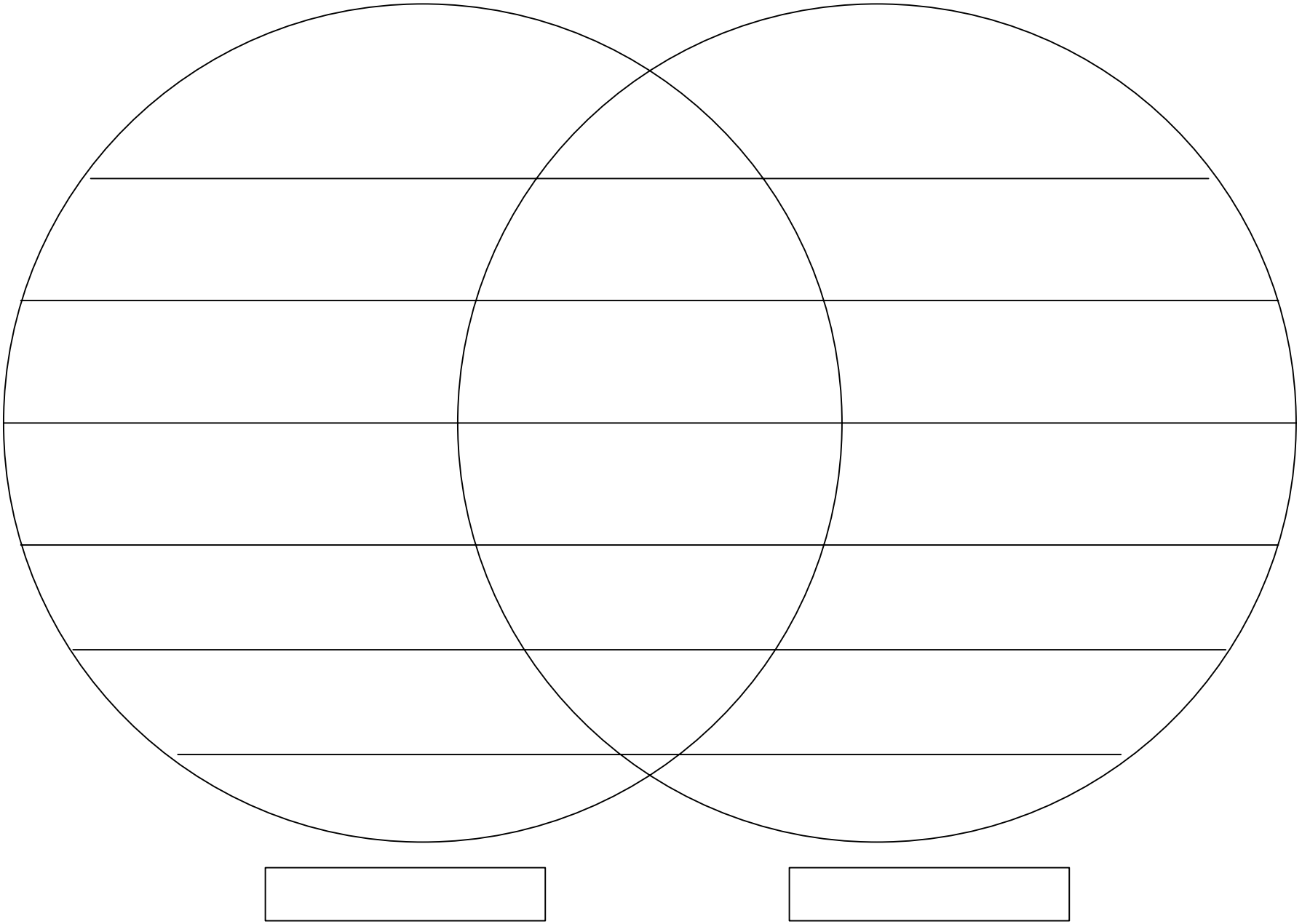
_____

Scoring Criteria for Writing:

- Provide specific examples to explain ideas
- Explain strategy for identifying odd/even numbers
- Use place value vocabulary to describe the numbers, such as hundreds, ones, tens, and thousands
- Compare numbers using terms greater than and less than

Name: _____ Date: _____

Student Resource Sheet # 14



Name: _____ Date: _____

1	2	3	4
5	6	7	8
9	0		